# PAVEMENT SECTION MATRIX

| UDO Street Type (See UDO paragraph 6.7.2 "Town Street Classifications" for R/W & street cross-section requirements) | ADT (vpd) | Minimum Pavement Section | | | | | |
|---|---|---|---|---|---|---|---|
| | | SuperPave Asphalt Thickness | | | Aggregate Base (ABC) | Geogrid [1] | Curb & Gutter [2] |
| | | Riding Surface (S-9.5B) | Intermediate Course (I-19.0B) | Base Course (B-25.0) | | | |
| **Urban Boulevard** (UDO 6.7.2B) | 25k to 55k | As Designed | As Designed | As Designed | 8 | Note 1 | Type 3 |
| **Avenue** (UDO 6.7.2C) | 15k to 30k | As Designed | As Designed | As Designed | 5 | - | Type 2 |
| **Commercial Street** (UDO 6.7.2D) | 10k to 18k | 2 | - | 4 | 5 | - | Type 1 |
| **Large Residential Street** (UDO 6.7.2E) | 2.5k to 15k | 2 | - | 4 | 5 | - | Type 2 or 4 |
| **Residential Yield Street** (UDO 6.7.2F) | 0 to 1k | 2 | - | - | 8 | Note 1 | Type 2 or 4 |
| **Lane** (UDO 6.7.2G) | 0 to 3k | 2 | - | - | 8 | Note 1 | Type 1 or 5 |
| **Alley** (UDO 6.7.2H) | N/A | 2 | - | - | 6 | - | N/A |
| **Industrial Access** [3] | N/A | As Designed | As Designed | As Designed | 8 | Note 1 | Type 3 |

1. *For all street classifications within the street right-of-way, the aggregate base thickness may be reduced by 2 inches if an approved Geogrid is installed between the compacted subgrade and the aggregate base. Geogrid to be Tensar BX1100 (SS-2), an approved equal, or as otherwise specified by a NC Licensed PE (Geotechnical Engineer).*
2. *Curb & Gutter Types (see Standard Detail 2.02):*
   - *Type 1 = 30-inch Standard Curb & Gutter.*
   - *Type 2 = 30-inch Standard Curb & Gutter or approved alternate.*
   - *Type 3 = 30-inch Standard Curb & Gutter with 5 inches of ABC below curb and extending a minimum of 6 inches beyond the back of the curb or approved alternate.*
   - *Type 4 = 30-inch Valley Curb.*
   - *Type 5 = LID or Swale.*
3. *Right-of-way and street section to be as required by Town Engineer.*
4. *Street pavement sections must be designed using the procedures outlined in the UDO, Section 3, Street and Subdivision Design, paragraph 3.3 Pavement Design Methods except that individual elements shall not be less than shown in the above table.*
5. *See UDO Section 6, Infrastructure Standards, paragraphs 6 5.3 Pedestrian/Bicycle Connections, 6.7.2 Town Street Classification, 6.8 Sidewalk and Other Pedestrian Facilities and 6.9 Bikeway Facilities for sidewalk and bikeway requirements.*

## Notes:

1. *Sidewalk and curb to be 3000 psi at 28 days air entrained concrete. Sidewalk to be scored every 5 ft with 1/2" expansion joints at 30 ft intervals. Provide non-slip finish. Concrete sidewalks to be 4" except thickness to increase to 6" at all driveway crossings and for a distance 5' either side of the driveway. Place 1/2" expansion joints at junction of 4" and 6" sidewalks.*
2. *Maximum grades and "K" valves for streets shall follow NCDOT guidelines for the Piedmont area (rolling topography). See Table 2.03.*
3. *All pavement thickness' shall generally be confirmed by a geotechnical investigation and report. However, if a developer wishes, he may design residential streets using a subgrade CBR one standard deviation to the left of the average of all CBR's determined by geotechnical reports thus far. If, in the opinion of the Town's representative, soils appear weaker or have inherent problems such as a high mica content, the services of a geotechnical engineer shall be required in any case for the design of pavements.*
4. *Electric service will not go in until street section is graded at final and approved.*
5. *The Town Engineer shall require a 1" overlay over any segment of street in which there are 3 or more trench failures, utility cuts, egregious imperfections or patches per 800 foot of street. If final surface is already placed, it must be milled down so as not to encroach into the gutter pan. A trench failure shall be defined as a depression of 1/2" or greater at the deepest point over a trench width. Extent of length of resurfacing shall be as determined by the Town's Engineer.*
6. *Time limits for completion of improvement: Refer to UDO Section 6.38.*

TOWN of WAKE FOREST

# TOWN of WAKE FOREST, NC

**Manual of Specifications, Standards and Design**

## PAVEMENTS SECTION MATRIX

| Scale: | Detail #: |
|---|---|
| Not To Scale | 2.01 |
| Revision Date: | Sheet #: |
| October, 2013 | 2 of 3 |

## Concrete Testing Requirements:

*Initial Test*

*The initial test (from first ready-mix truck) is to be taken after the second yard is dispatched from the mixer and is to consist of the following:*

1. *One slump test*
2. *Pull, prepare and store 3 cylinders on-site for 24 hours.*
3. *Temperature*

*Subsequent Tests*

*After the above tests are pulled from the initial truck, every 5th truck thereafter is to be tested in the same manner as noted above.*

## Asphalt Testing Requirements:

*Compaction:* *Testing for asphalt density is to follow NCDOT "Standard Specifications for Roads and Structures", Section 609-7 "Field Compaction Quality Control" and Section 609-9, "Quality Assurance" latest revision.*

*Thickness:* *The minimum frequency of coring for thickness testing shall be on the basis of test sections consisting of not more than 1500 linear feet of lay down width, exclusive of intersections and irregular areas. The test sample is to be a 6-inch cored sample. The sample is to be numbered and logged for identification purposes.*

*Contractor's Quality Control System:*

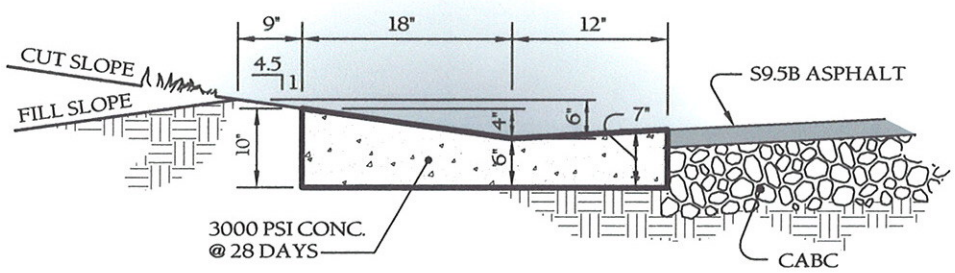
*Follow NCDOT "Standard Specifications for Roads and Structures", Section 609-4 "Contractor's Quality Control Personnel Requirements" and Section 609-5, "Contractor's Quality Control Field Laboratory Requirements," latest revision.*

*Mixture and Job Mix Formula Adjustments:*

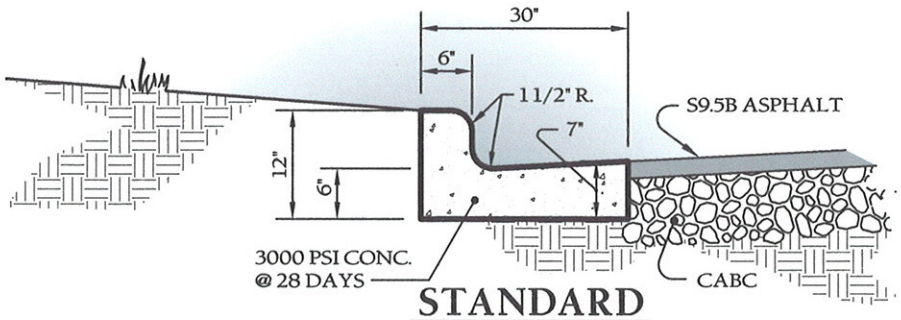
*Follow NCDOT "Standard Specifications for Roads and Structures", Section 609-3. "Field Verification of Mixture and Job Mix Formula Adjustments", latest revision.*

*General:* *All other applicable sections of Section 609 of the NCDOT "Standard Specifications for Roads and Structures" shall apply relating to Quality Control Plan, mix design, control limits, corrective action, equipment and measurement.*

*Testing Cost:* *Project Owner is responsible for cost of testing.*




## 30" VALLEY - STANDARD




## STANDARD

## NOTES:

1. *Score curb / valley gutter at 15' O.C.*
2. *Provide 1/2" expansion joints at 90' O.C.*
3. *For transition of curb to curb opening inlet, see standard detail 2.50*

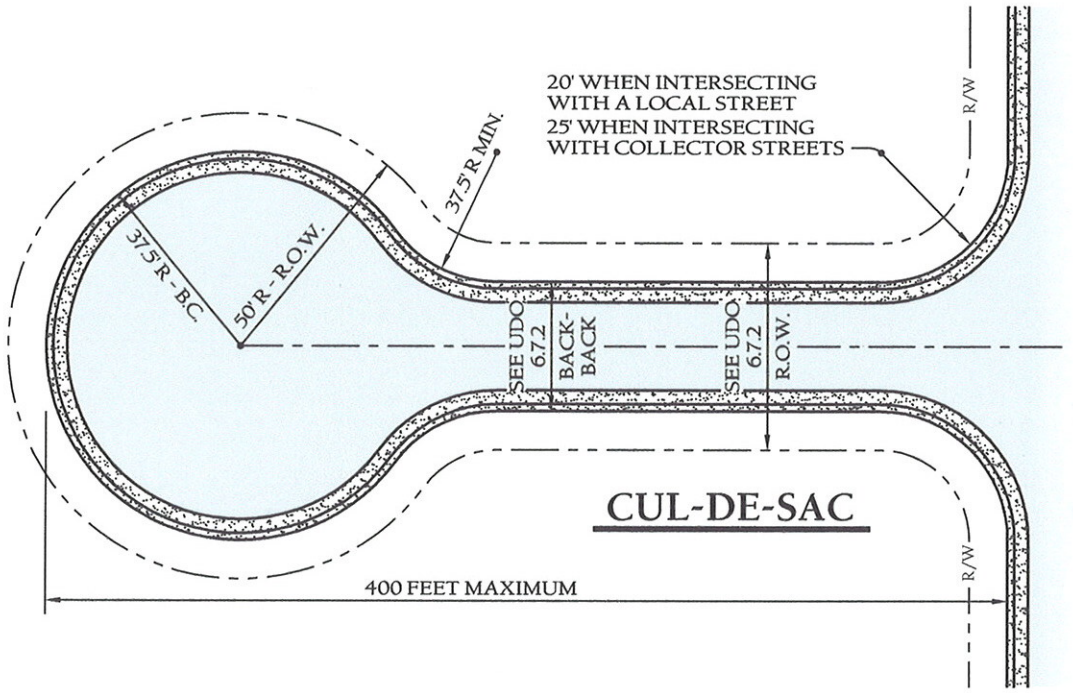
TOWN of WAKE FOREST

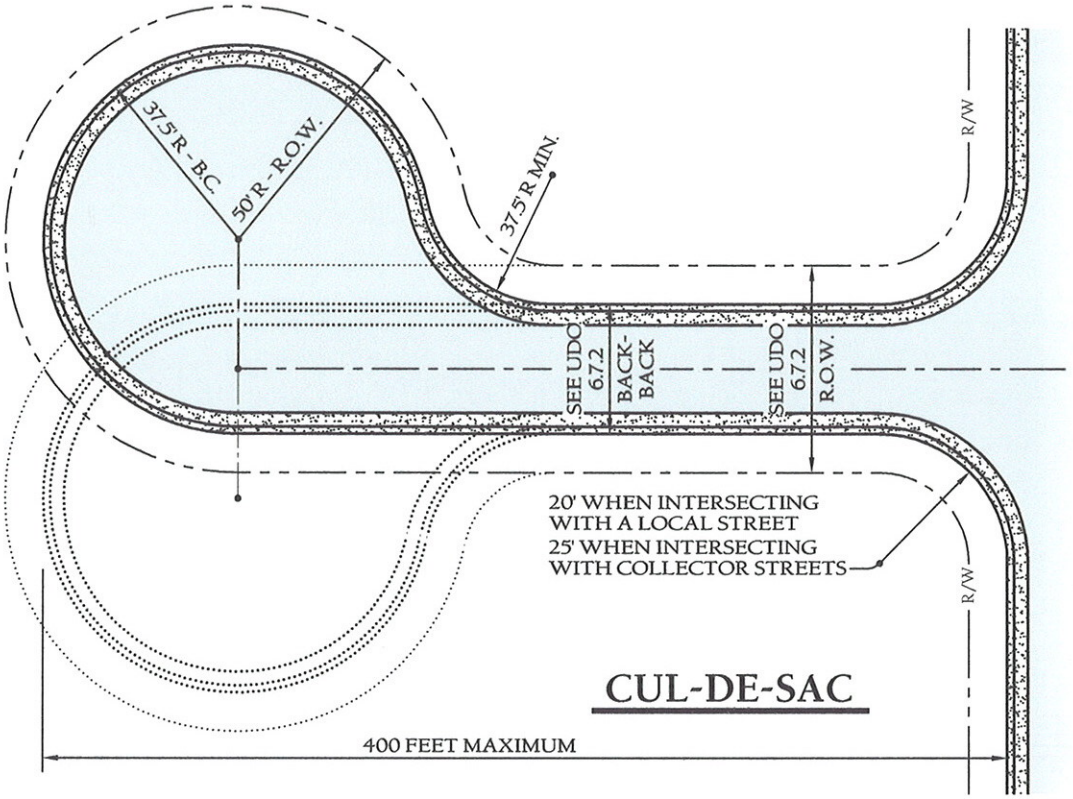
# TOWN of WAKE FOREST, NC

**Manual of Specifications, Standards and Design**

## STD. CURB & GUTTER & VALLEY GUTTER DETAIL

| Scale: | Detail #: |
|---|---|
| Not To Scale | 2.02 |
| Revision Date: | Sheet #: |
| October, 2013 | 1 of 1 |




## NOTES:

1. *See UDO 6.7.2 for pavement and right-of-way dimensions.*

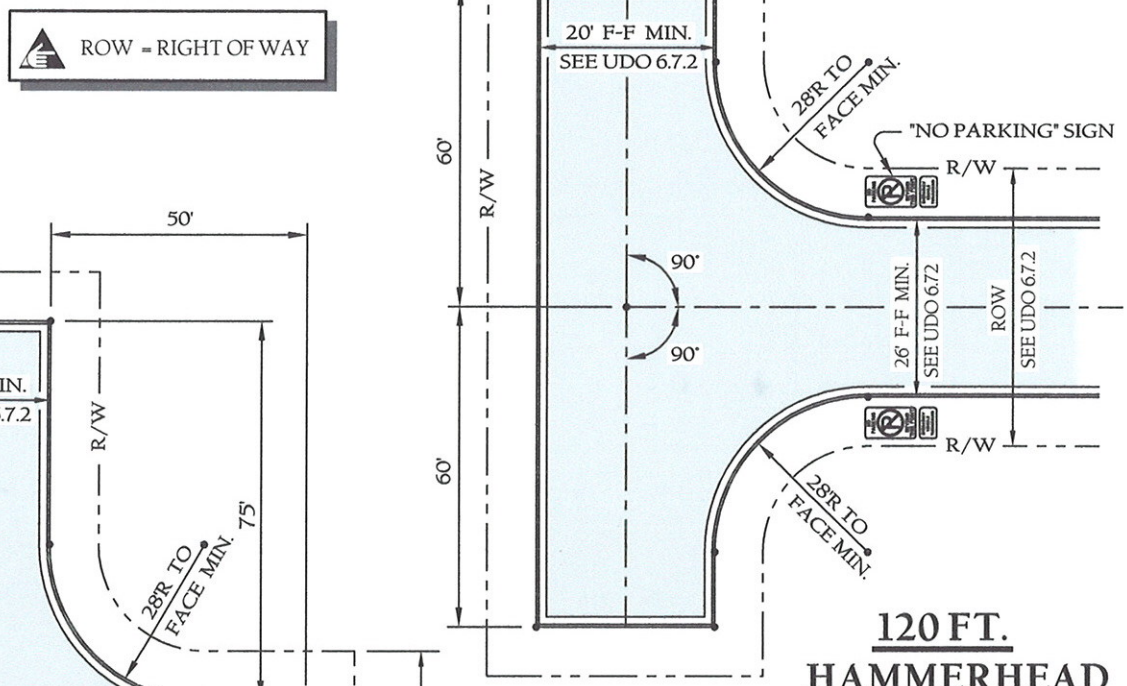
TOWN of WAKE FOREST

# TOWN of WAKE FOREST, NC

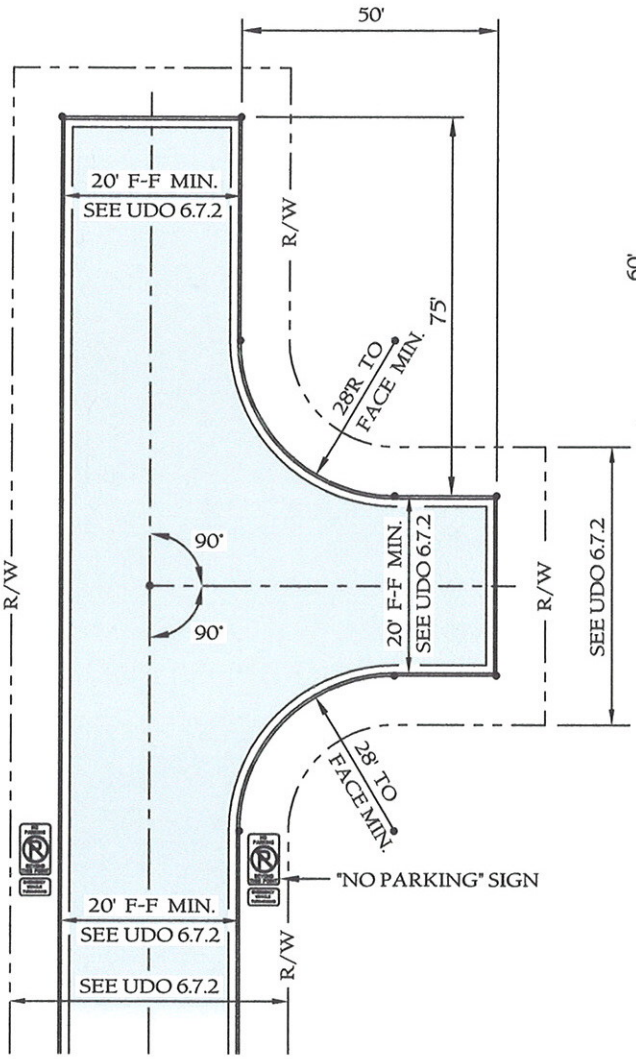
**Manual of Specifications, Standards and Design**

## CUL-DE-SAC DIMENSIONS

| Scale: | Detail #: |
|---|---|
| Not To Scale | 2.04 |
| Revision Date: | Sheet #: |
| October, 2013 | 1 of 2 |




## 120 FT. HAMMERHEAD




## ALTERNATE TO 120 FT. HAMMERHEAD



## NO PARKING SIGN

## NOTES:

1. *See UDO 6.7.2 for pavement and right-of-way dimensions.*
2. *Ref: N.C. Fire Code Appendix B.*

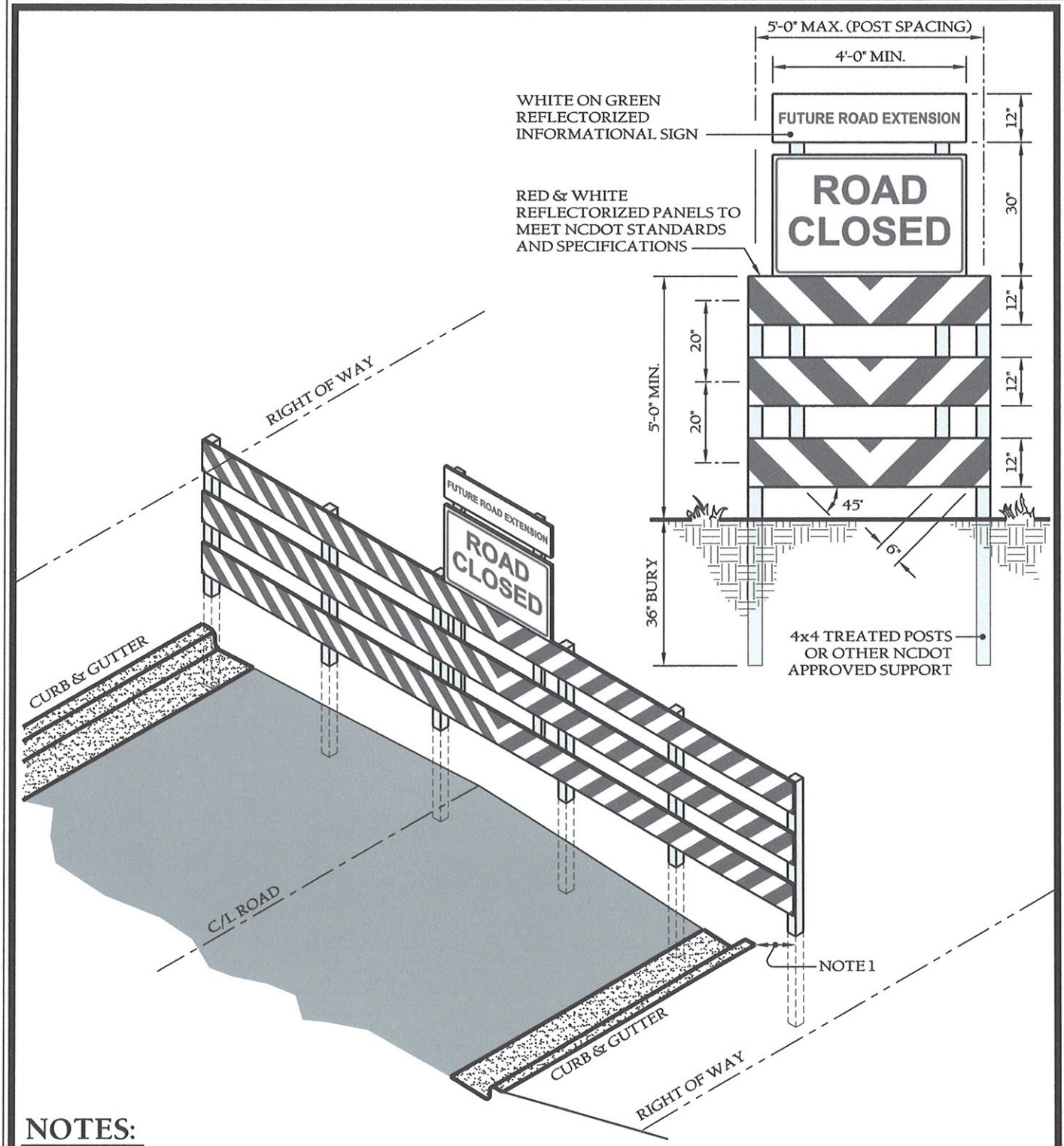
TOWN of WAKE FOREST

# TOWN of WAKE FOREST, NC

**Manual of Specifications, Standards and Design**

## CUL-DE-SAC DIMENSIONS

| Scale: | Detail #: |
|---|---|
| Not To Scale | 2.04 |
| Revision Date: | Sheet #: |
| October, 2013 | 2 of 2 |




## NOTES:

1. *Barricade to be created across entire roadway including curb & gutter.*
2. *Advance warning sign W14-1 (DEAD END) shall be placed just after last intersection.*
3. *Markings for barricade rails shall be reflective and alternate red and white stripes.*
4. *"ROAD CLOSED" sign shall meet specifications of M.U.T.C.D. R11-2 and be required atop each barricade used.*

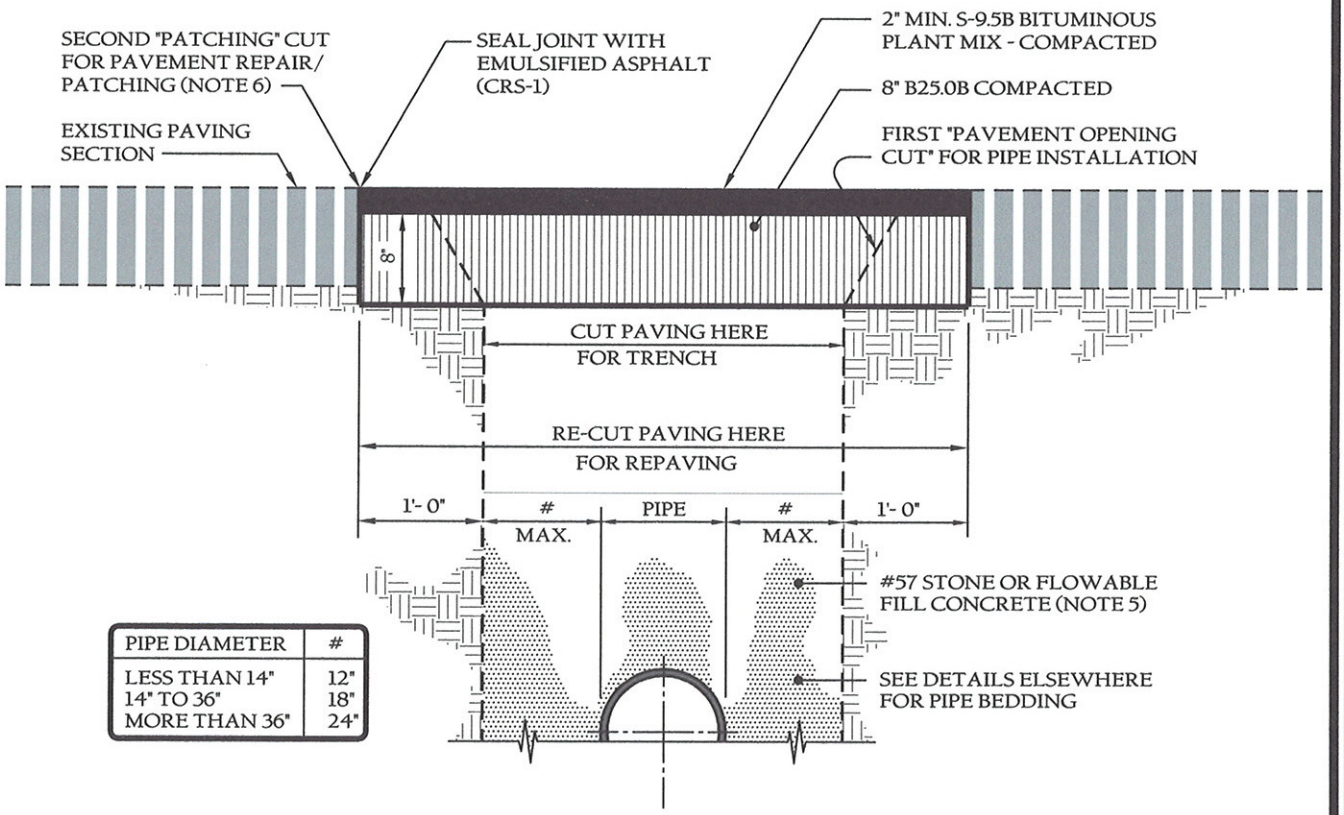
TOWN of WAKE FOREST

# TOWN of WAKE FOREST, NC

**Manual of Specifications, Standards and Design**

## DEAD END ROAD BARRICADE

| Scale: | Detail #: |
|---|---|
| Not To Scale | 2.05 |
| Revision Date: | Sheet #: |
| October, 2013 | 1 of 1 |




| PIPE DIAMETER | # |
|---|---|
| LESS THAN 14" | 12" |
| 14" TO 36" | 18" |
| MORE THAN 36" | 24" |

## NOTES:

1. *Pavement repairs shall have 8" compacted B25.0B and 2" topping of S9.5B mix. Compact to min. 92% Maximum Specific Gravity.*
2. *Trench is to be back filled in 6" lifts and compacted to 95% standard density as determined by AASHTO test method T-99 or ASTM D698 before pavement repairs are made. No excavated fill to be used for backfill. See detail 2.53.*
3. *Compaction test may be required at request of inspector.*
4. *All existing Town of Wake Forest paved streets and secondary roads which are open cut to install any utility, must be repaired according to this detail.*
5. *Fiber optic & gas: #57 stone or flowable fill concrete (minimum 30 psi) but min. 6" compacted class II or III (Definition in section 02210 - paragraph 2.1.1 of Specs) fill over top of fiber optic cable or gas pipe.*
6. *Existing pavement to be saw cut. Provide a smooth uniform pavement cut without jagged or irregular edge.*
7. *If paving is not done immediately, fill final 10" with ABC until ready to pave patch.*

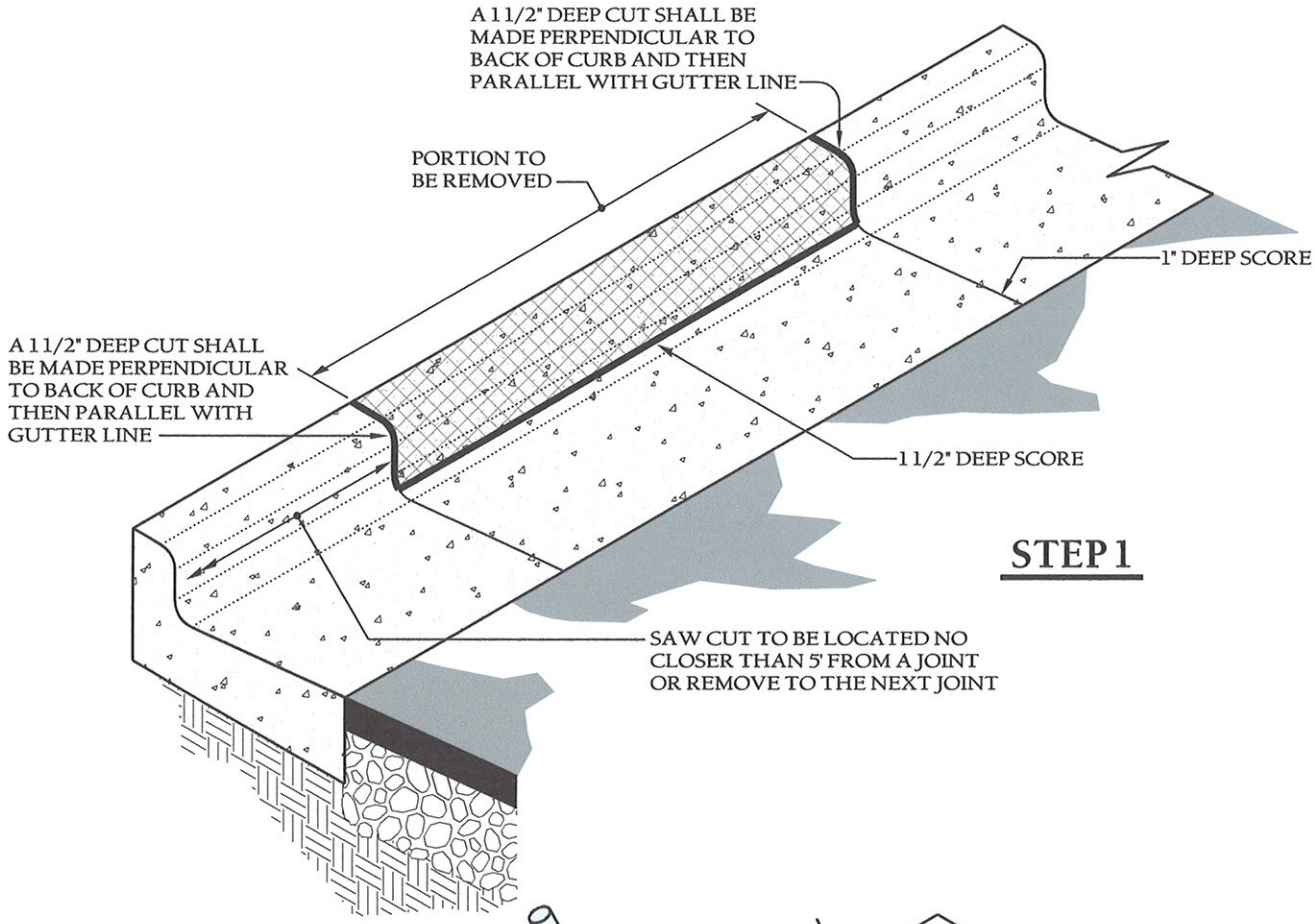
TOWN of WAKE FOREST

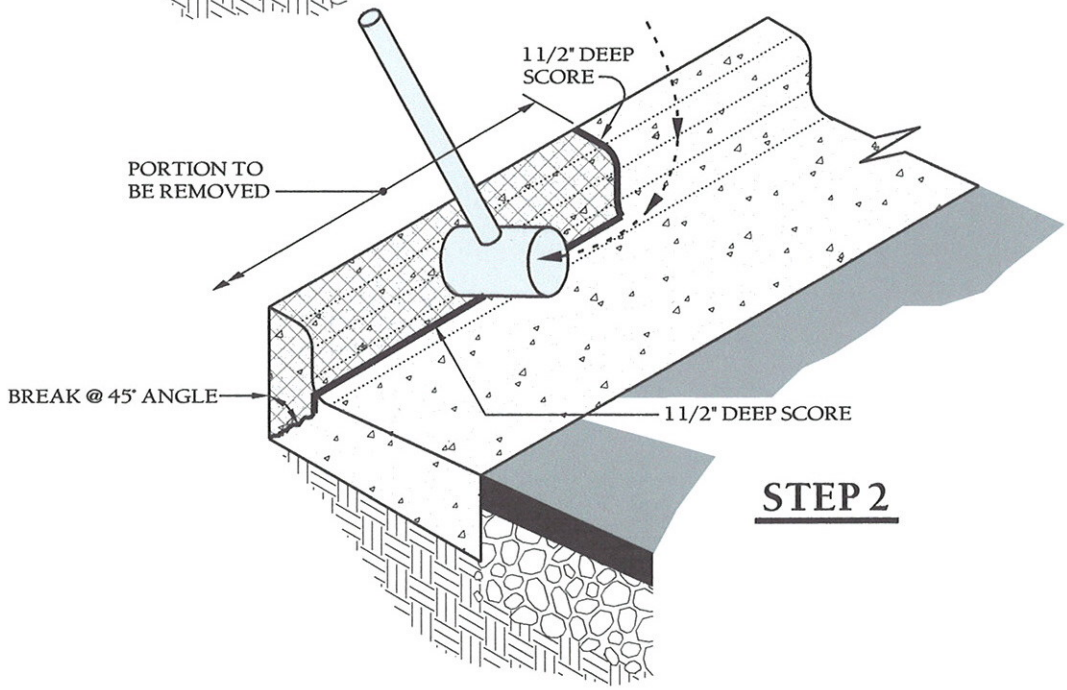
# TOWN of WAKE FOREST, NC

**Manual of Specifications, Standards and Design**

## FULL DEPTH ASPHALT REPAIR DETAIL FOR UTILITY CUTS

| Scale: | Detail #: |
|---|---|
| Not To Scale | 2.06 |
| Revision Date: | Sheet #: |
| October, 2013 | 1 of 1 |



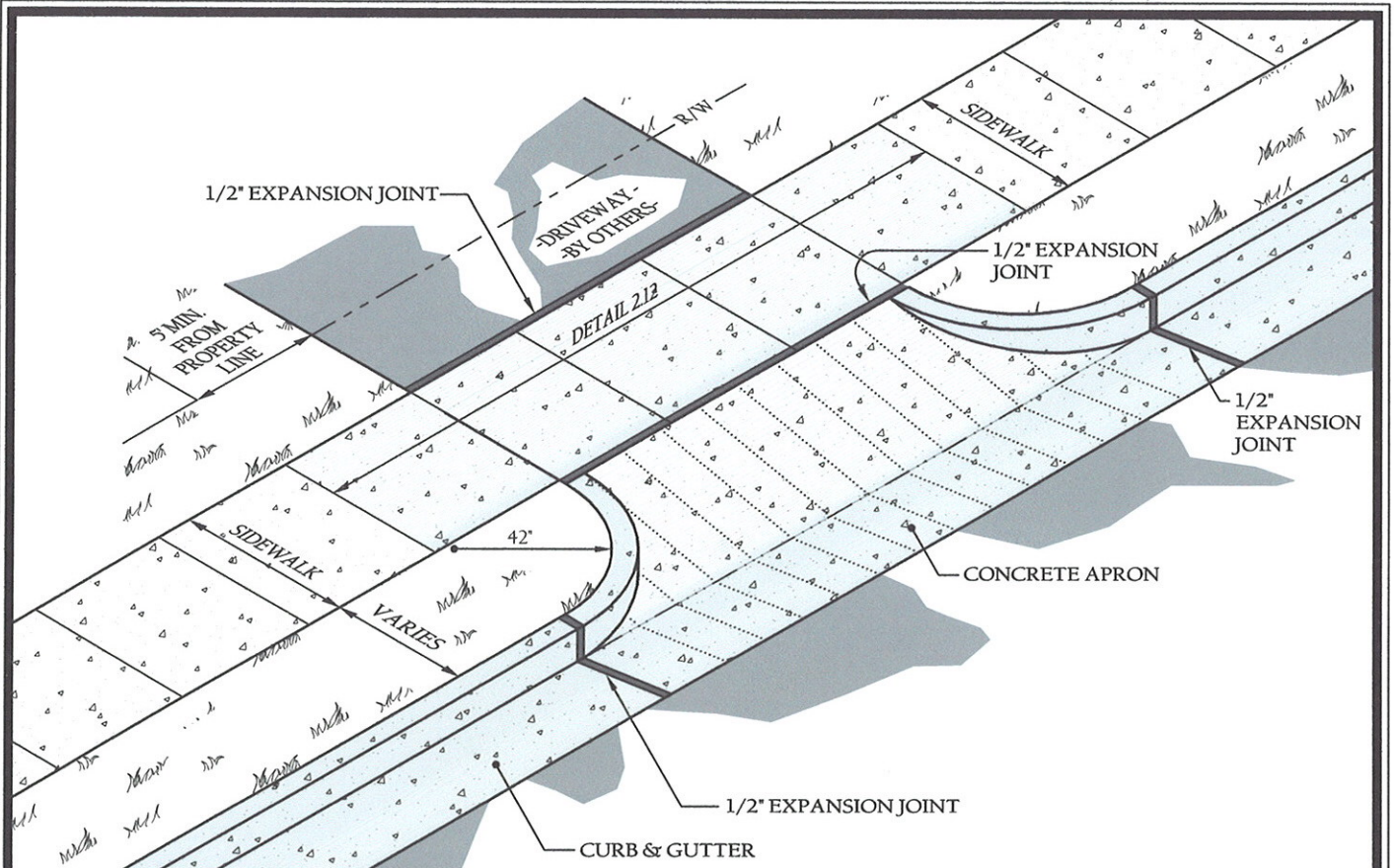

TOWN of WAKE FOREST

# TOWN of WAKE FOREST, NC

**Manual of Specifications, Standards and Design**

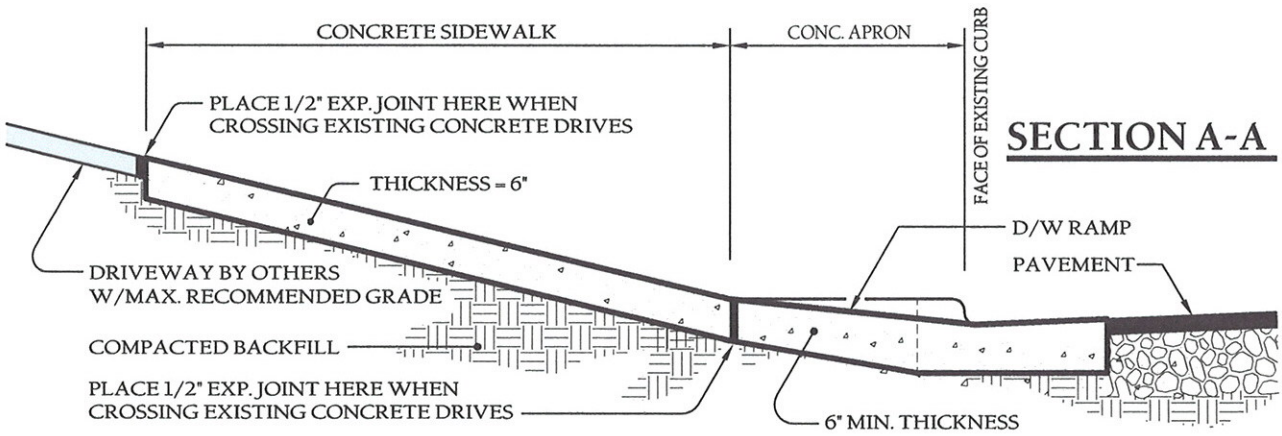
## STREET CURB CUT FOR DRIVEWAYS ON C&G STREETS

| Scale: | Detail #: |
|---|---|
| Not To Scale | 2.08 |
| Revision Date: | Sheet #: |
| October, 2013 | 1 of 3 |




## NOTES:

1. Residential driveway to be 12' in width. (UDO 9.8.1.D)
2. Commercial and industrial driveways to be a maximum of 36' wide. (UDO 9.8.1.D)
3. All concrete shall be 3000 psi @ 28 days air entrained.
4. Curb shall be tapered to finish flush with sidewalk.
5. Beginning radius shall not encroach on adjacent properties based on a projection of property line from the right-of-way to the curb line.
6. Sidewalk section shall not be required along streets which are not planned for sidewalk.
7. See also UDO 9.8 Driveway Access for other requirements.
8. Concrete must come from a ready mix concrete truck to ensure mix meets air entrainment requirements. No site mix or sakrete mix allowed.




## SECTION A-A

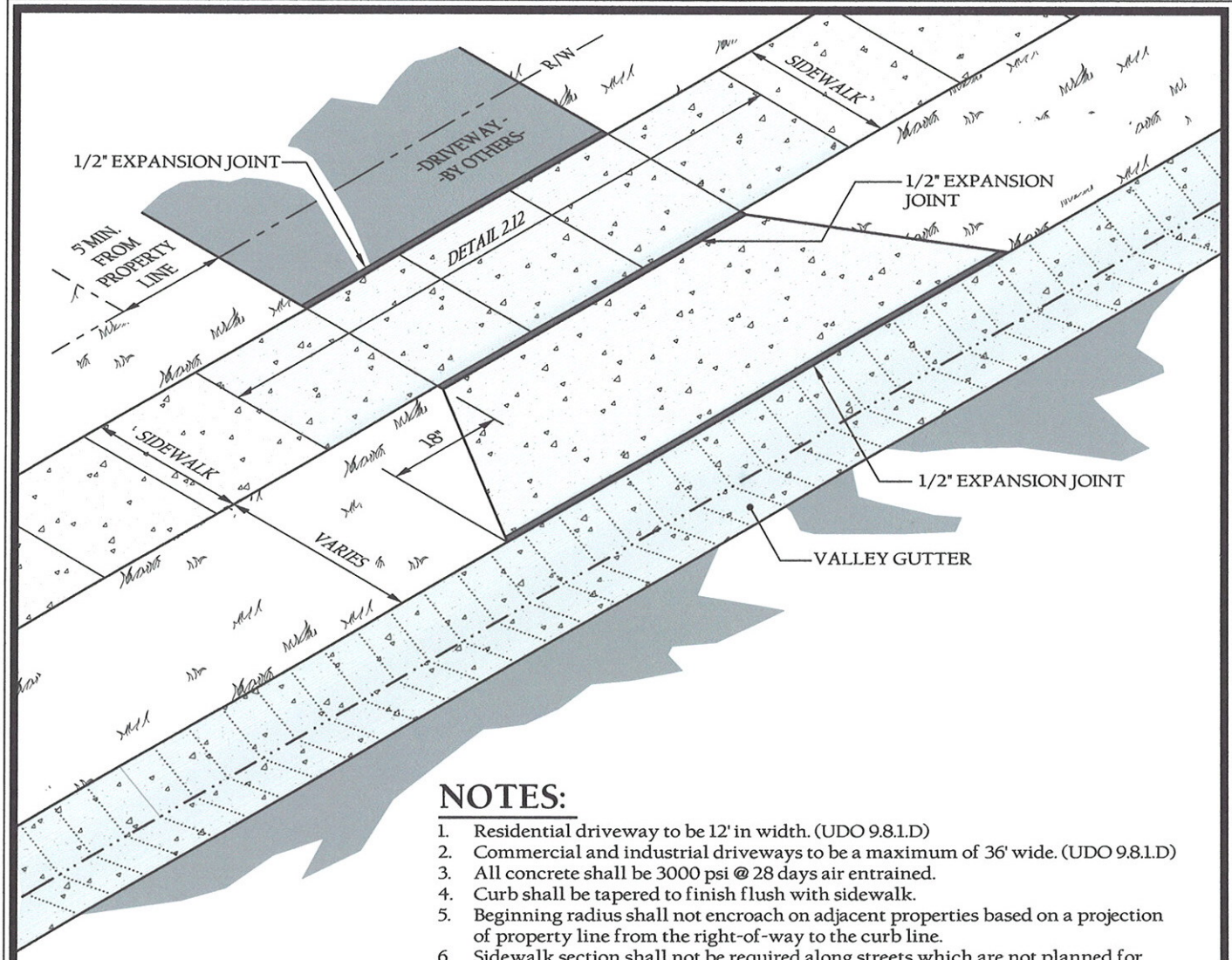
TOWN of WAKE FOREST

# TOWN of WAKE FOREST, NC

**Manual of Specifications, Standards and Design**

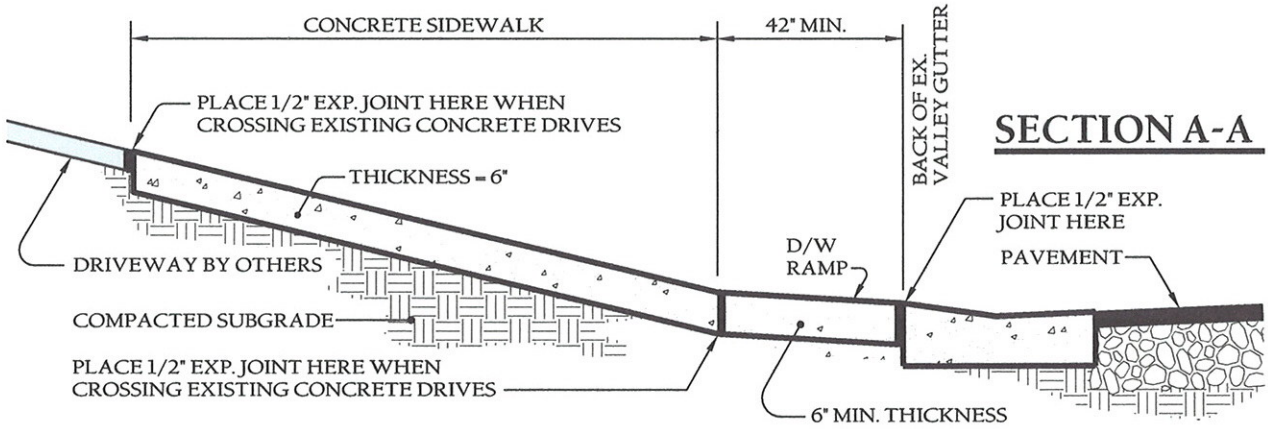
# STREET CURB CUT FOR DRIVEWAYS ON C&G STREETS

| Scale: | Detail #: |
|---|---|
| Not To Scale | 2.08 |
| Revision Date: | Sheet #: |
| October, 2013 | 2 of 3 |




## NOTES:

1. Residential driveway to be 12' in width. (UDO 9.8.1.D)
2. Commercial and industrial driveways to be a maximum of 36' wide. (UDO 9.8.1.D)
3. All concrete shall be 3000 psi @ 28 days air entrained.
4. Curb shall be tapered to finish flush with sidewalk.
5. Beginning radius shall not encroach on adjacent properties based on a projection of property line from the right-of-way to the curb line.
6. Sidewalk section shall not be required along streets which are not planned for sidewalk.
7. See also UDO 9.8 Driveway Access for other requirements.
8. Concrete must come from a ready mix concrete truck to ensure mix meets air entrainment requirements. No site mix or sakrete mix allowed.




## SECTION A-A

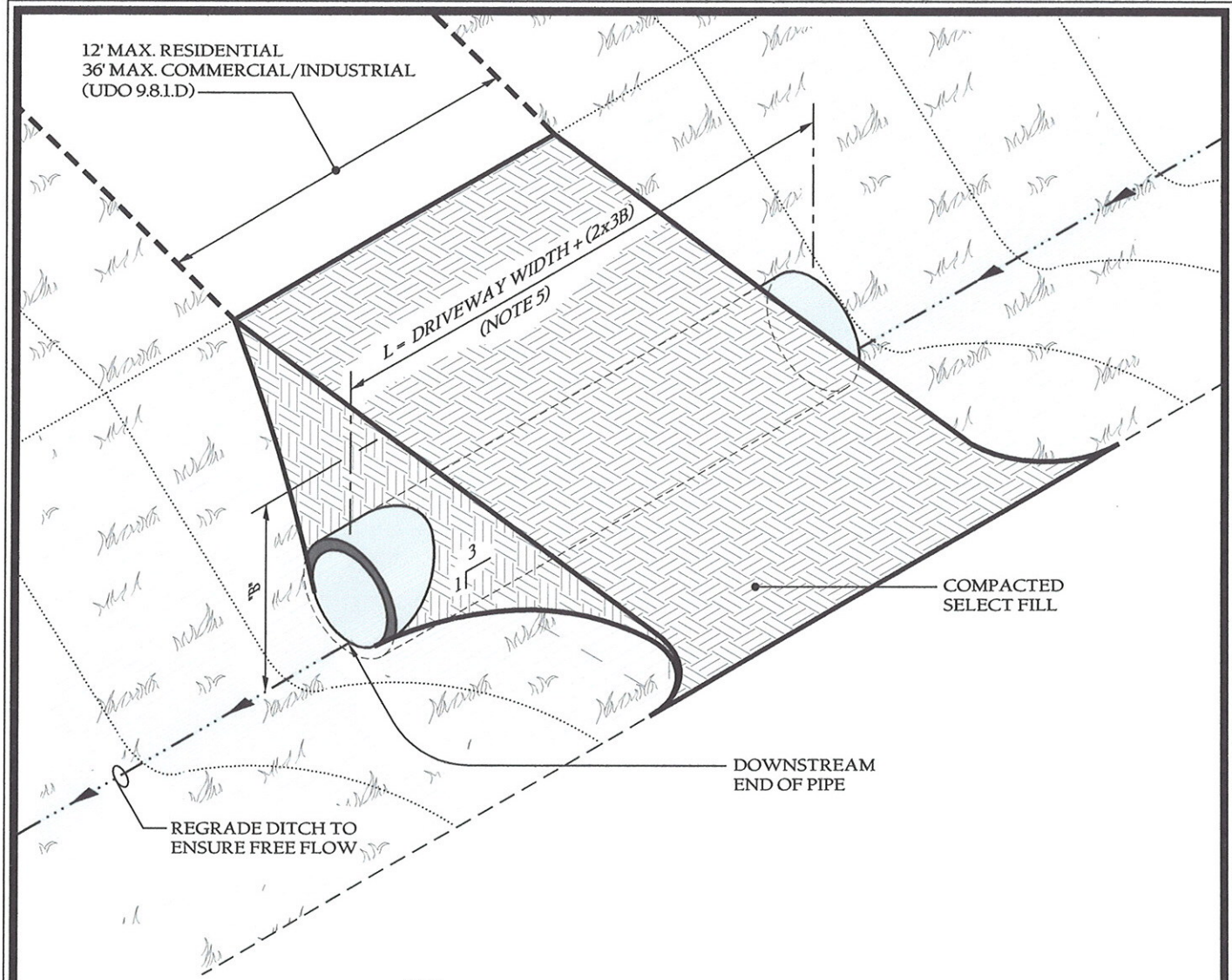
TOWN of WAKE FOREST

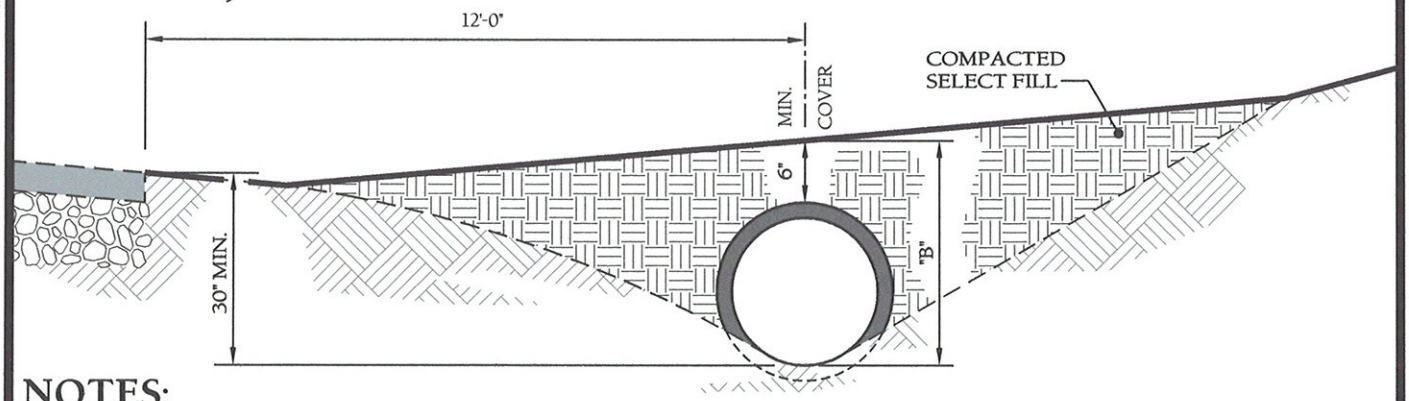
# TOWN of WAKE FOREST, NC

**Manual of Specifications, Standards and Design**

# FLARED DRIVEWAY ENTRANCE TO VALLEY GUTTER

| Scale: | Detail #: |
|---|---|
| Not To Scale | 2.08 |
| Revision Date: | Sheet #: |
| October, 2013 | 3 of 3 |




## NOTES:

1. D/w pipe 18" and above to have flared end sections.
2. Minimum diameter pipe to be 15" class III "C" wall.
3. D/W pipe to be staked by N.C. licensed surveyor.
4. Driveway pipe shall be concrete pipe only.
5. "L" to be rounded up to next 4' increment.
6. Decorative headwalls may be allowed at discretion of Town's Engineer. An encroachment agreement will be required.

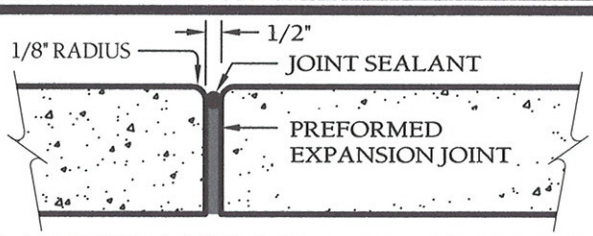
TOWN of WAKE FOREST

# TOWN of WAKE FOREST, NC

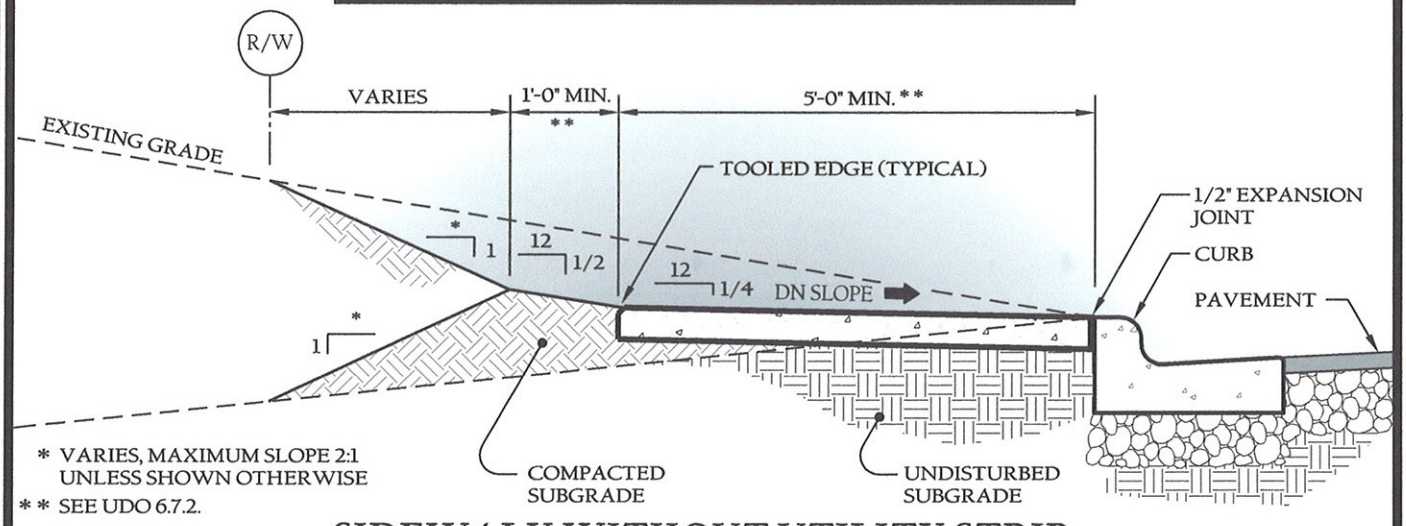
**Manual of Specifications, Standards and Design**

## INSTALLATION OF D/W PIPE IN STREET SECTION

| Scale: | Detail #: |
|---|---|
| Not To Scale | 2.09 |
| Revision Date: | Sheet #: |
| October, 2013 | 1 of 1 |



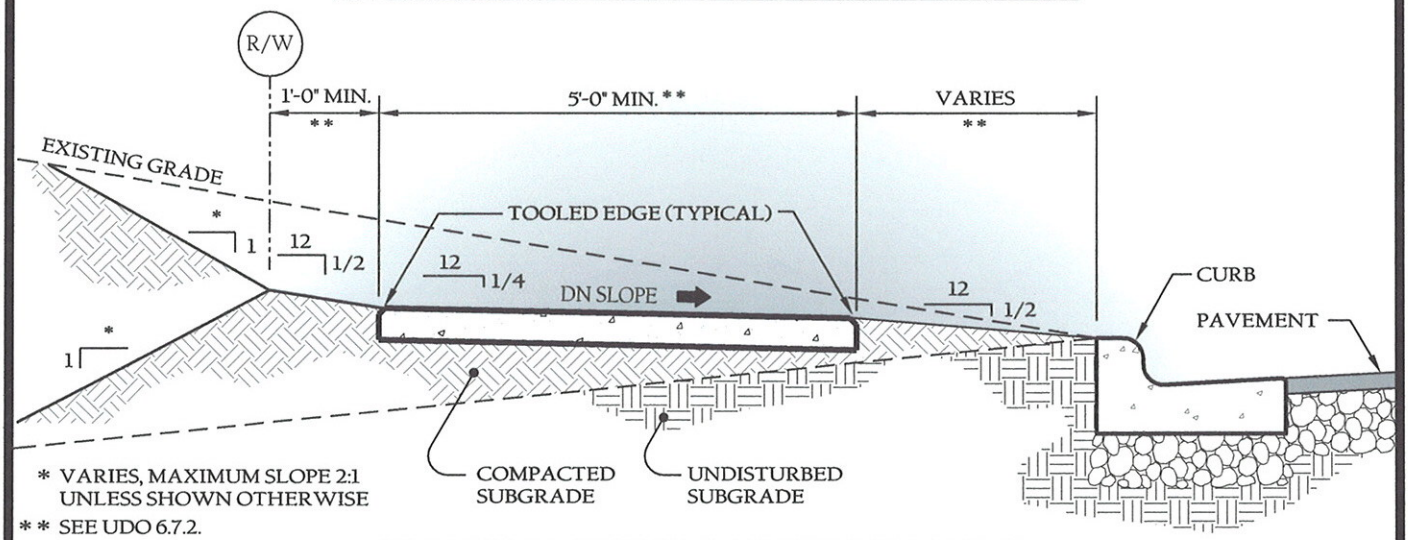

## TYPICAL EXPANSION JOINT DETAIL




* VARIES, MAXIMUM SLOPE 2:1 UNLESS SHOWN OTHERWISE

** SEE UDO 6.7.2.

## SIDEWALK WITHOUT UTILITY STRIP




* VARIES, MAXIMUM SLOPE 2:1 UNLESS SHOWN OTHERWISE

** SEE UDO 6.7.2.

## SIDEWALK WITH UTILITY STRIP

## NOTES:

1. Provide 3/4" deep tooled score at 5'-0" O.C.
2. Expansion joints to be placed 30'-0" O.C. longitudinally, adjacent to curbs, and when butting existing structures, concrete, or buildings.
3. Concrete to be 3,000 P.S.I. at 28 days, air-entrained.
4. Subgrade should not contain organic matter or plastic clays. When found, refer to specs or contact engineer for directions.
5. Areas of fill are to be compacted to 95% standard proctor using NCDOT Class III borrow or better. Remove topsoil before placing borrow.
8. Concrete must come from a ready mix concrete truck to ensure mix meets air entrainment requirements. No site mix or sakrete mix allowed.
9. See Specification 02400, paragraph 2.1.3 & 2.1.4 for expansion joint & joint sealer specs.

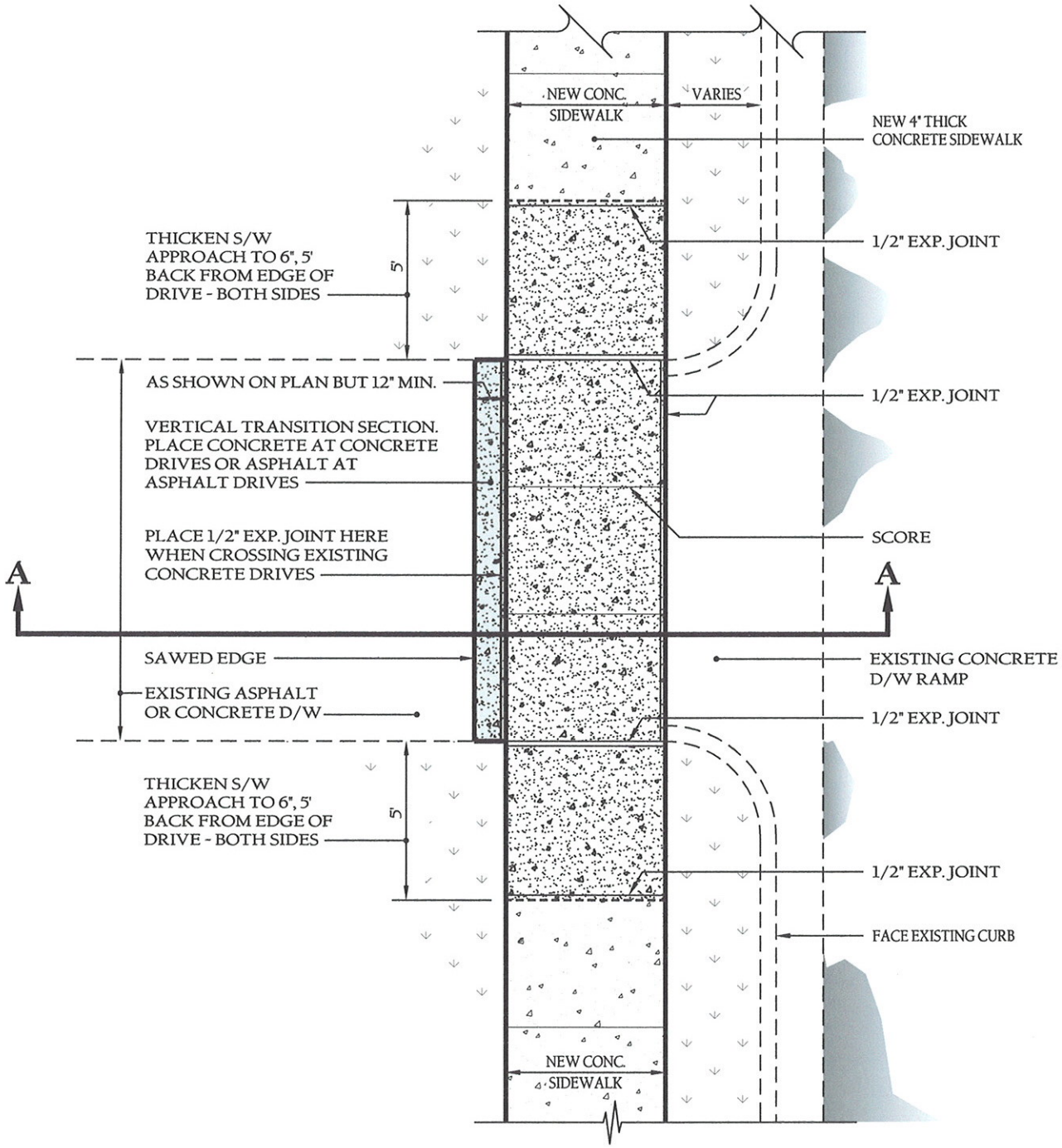
TOWN of WAKE FOREST

# TOWN of WAKE FOREST, NC

**Manual of Specifications, Standards and Design**

## TYP SIDEWALK in CUT or FILL SECTIONS

| Scale: | Detail #: |
|---|---|
| Not To Scale | 2.11 |
| Revision Date: | Sheet #: |
| October, 2013 | 1 of 1 |




## NOTES:

1. Concrete must come from a ready mix concrete truck to ensure mix meets air entrainment requirements. No site mix or sakrete mix allowed.

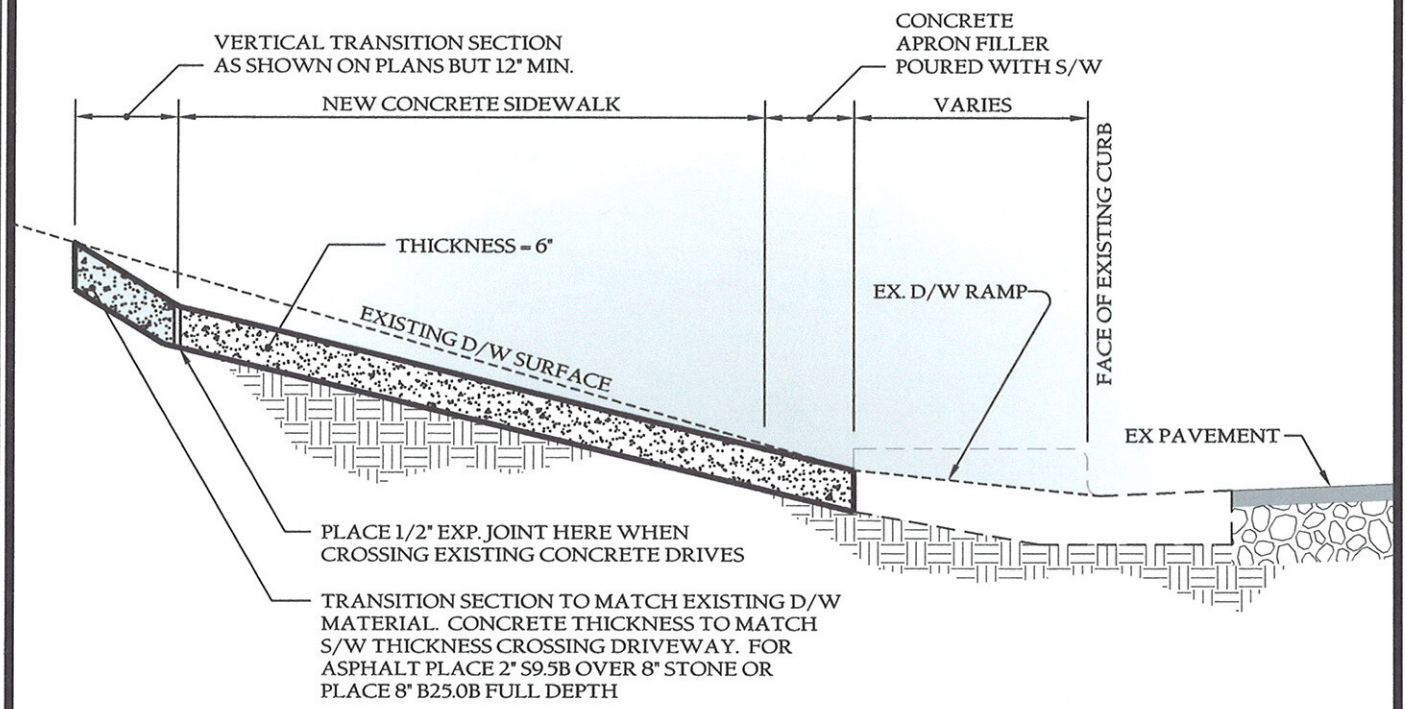
TOWN of WAKE FOREST

# TOWN of WAKE FOREST, NC

**Manual of Specifications, Standards and Design**

## SIDEWALK DETAIL X-ING EX. DRIVEWAYS

| Scale: | Detail #: |
|---|---|
| Not To Scale | 2.12 |
| Revision Date: | Sheet #: |
| October, 2013 | 1 of 2 |




## SECTION A-A

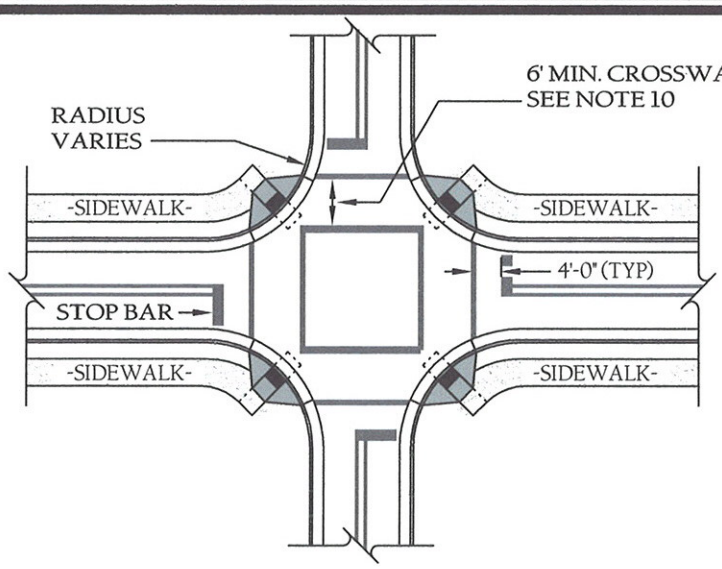
TOWN of WAKE FOREST

# TOWN of WAKE FOREST, NC

**Manual of Specifications, Standards and Design**

## SIDEWALK DETAIL X-ING EX. DRIVEWAYS

| Scale: | Detail #: |
|---|---|
| Not To Scale | 2.12 |
| Revision Date: | Sheet #: |
| October, 2013 | 2 of 2 |

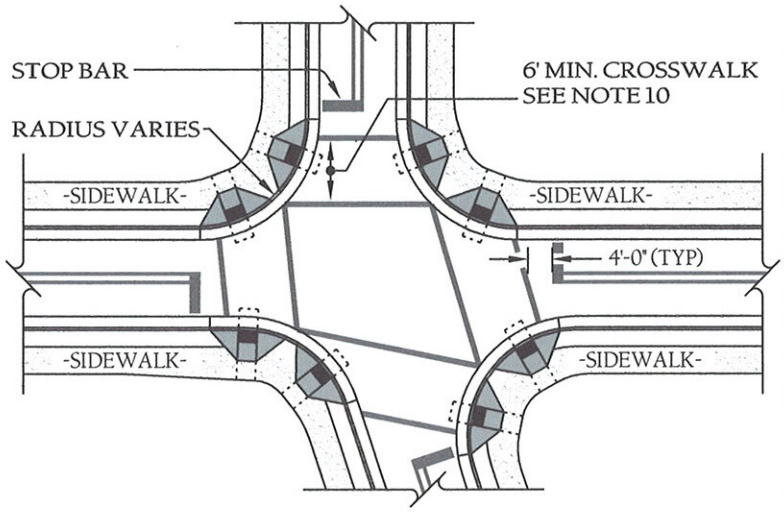


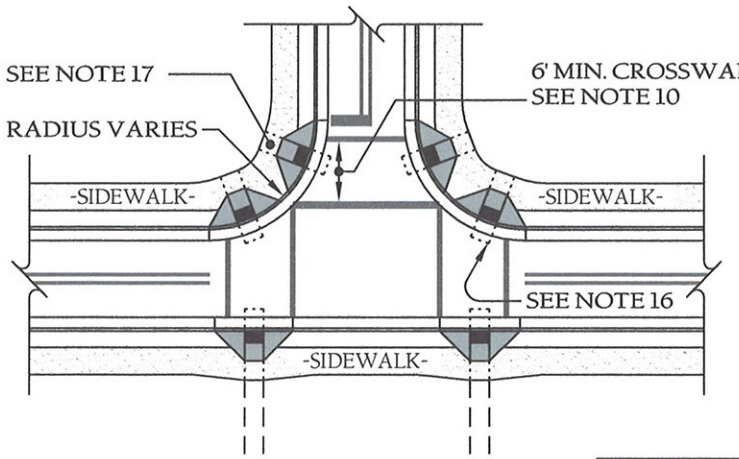

## FOR CROSSING INTERSECTIONS

*DETAIL SHOWING TYPICAL LOCATION OF SINGLE CURB RAMPS, PEDESTRIAN CROSSWALKS AND STOP LINES FOR TEE INTERSECTIONS*

## FOR CROSSING INTERSECTIONS

*DETAIL SHOWING TYPICAL LOCATION OF DUAL CURB RAMPS, PEDESTRIAN CROSSWALKS AND STOP LINES FOR TEE INTERSECTIONS*




## FOR TEE INTERSECTIONS

*DETAIL SHOWING TYPICAL LOCATION OF CURB RAMPS, PEDESTRIAN CROSSWALKS AND STOP LINES FOR TEE INTERSECTIONS*

*PROPOSED CURB RAMP*

-SIDEWALK- *PROPOSED OR FUTURE SIDEWALK*

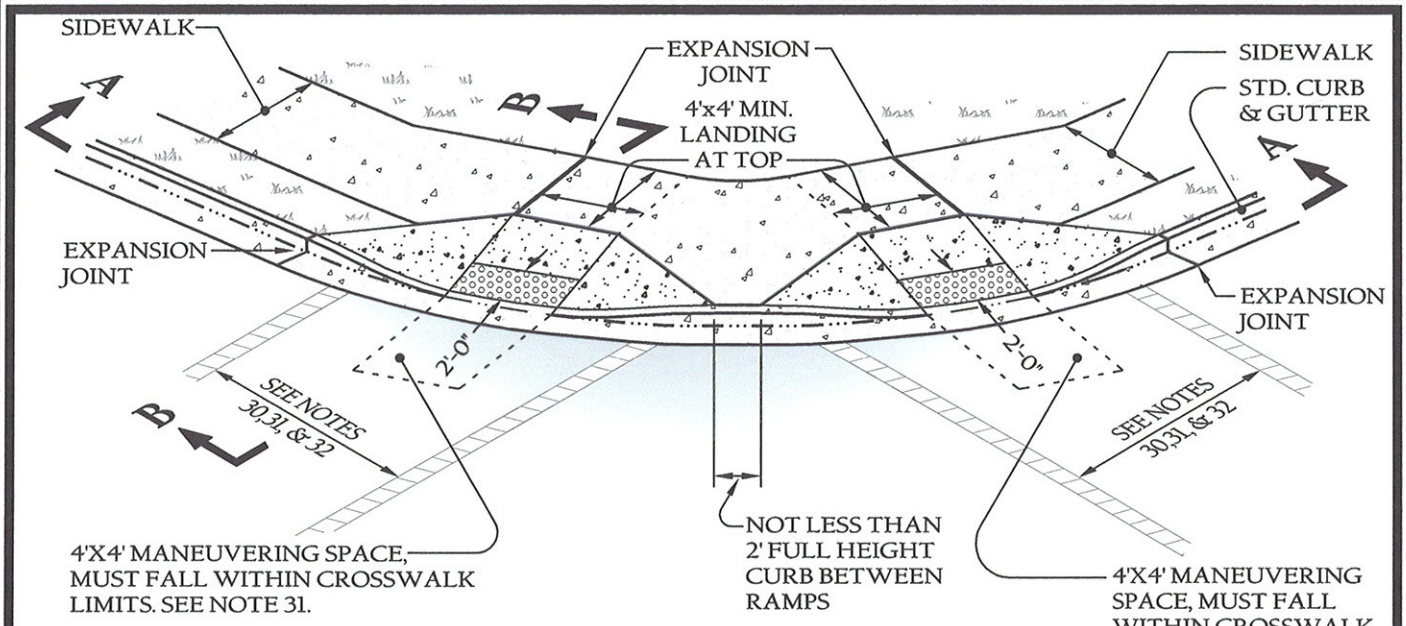
TOWN of WAKE FOREST

# TOWN of WAKE FOREST, NC

**Manual of Specifications, Standards and Design**

## STANDARD CURB RAMP PLACEMENT DETAIL

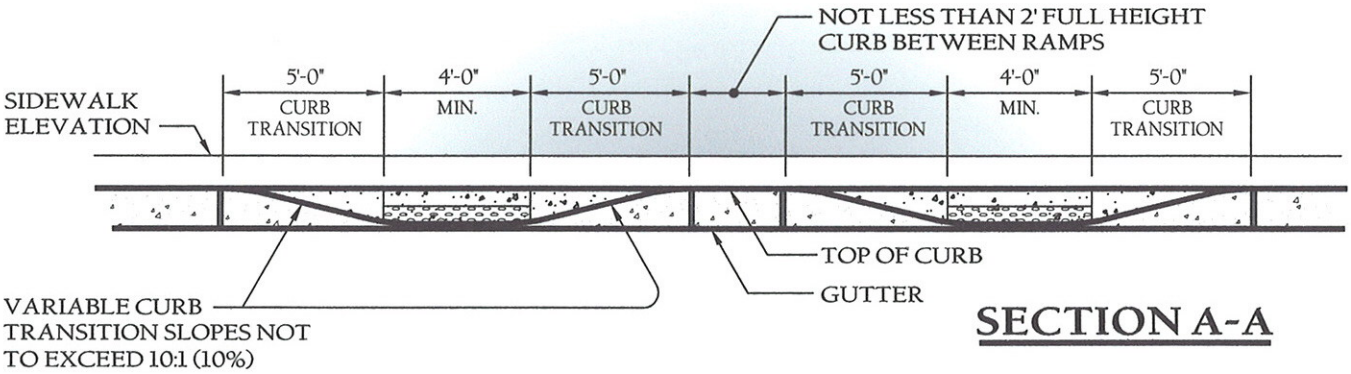
| Scale: | Detail #: |
|---|---|
| Not To Scale | 2.13 |
| Revision Date: | Sheet #: |
| October, 2013 | 1 of 15 |



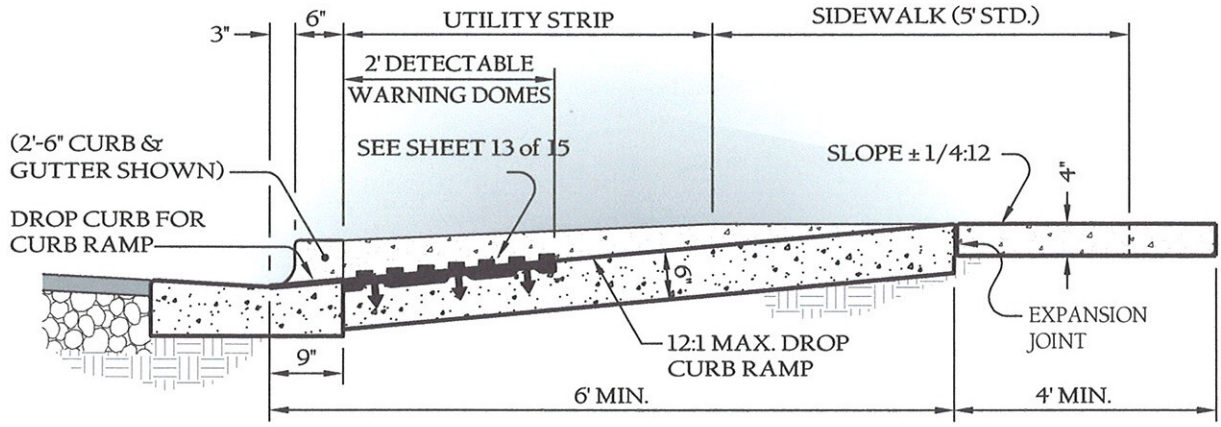

## DUAL RAMPS

ANY RADII

*NOTE: A PORTION OF ONE OR BOTH RAMPS MAY EXTEND OUTSIDE THE RETURNS*




## SECTION A-A




## SECTION B-B

TOWN of WAKE FOREST

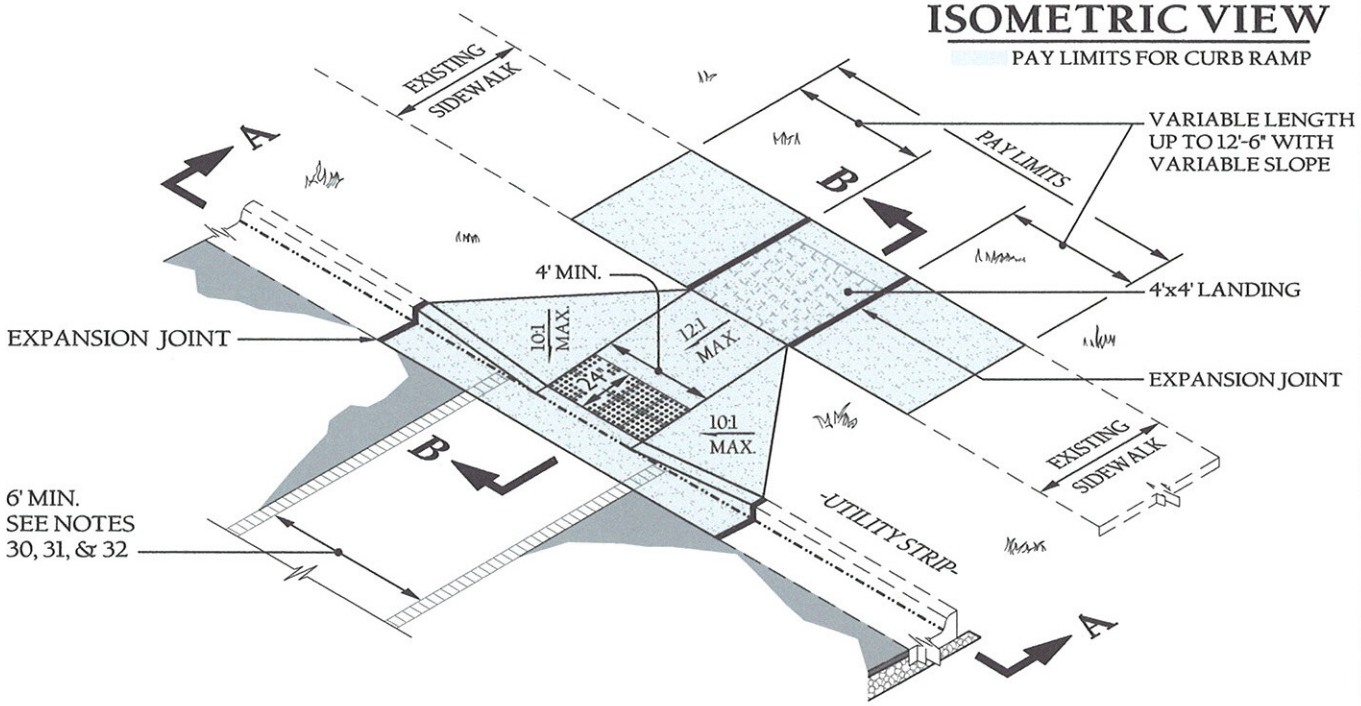
# TOWN of WAKE FOREST, NC

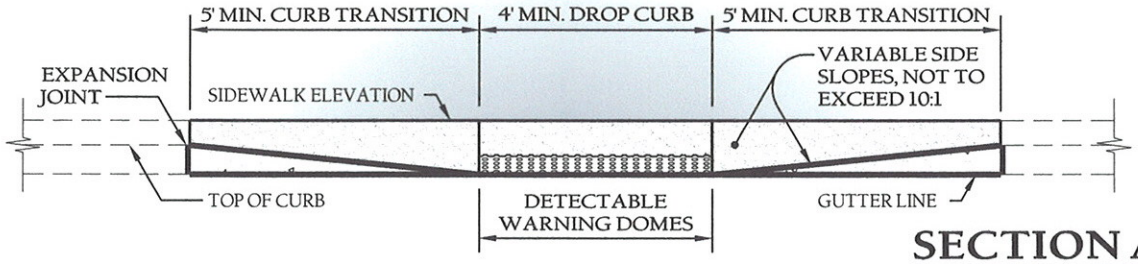
**Manual of Specifications, Standards and Design**

## STANDARD CURB RAMP DETAILS

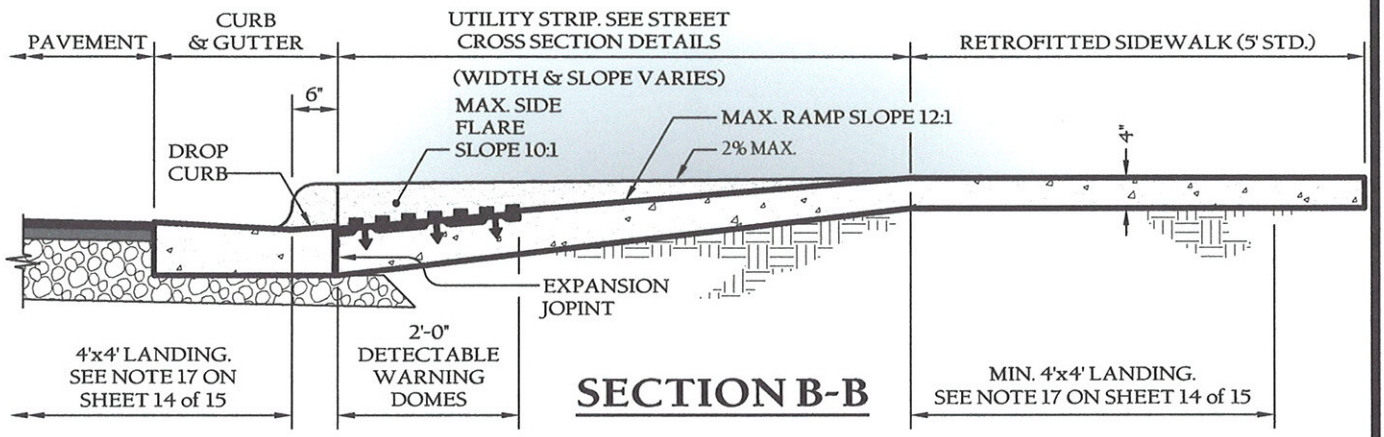
| Scale: | Detail #: |
|---|---|
| Not To Scale | 2.13 |
| Revision Date: | Sheet #: |
| October, 2013 | 2 of 15 |

# ISOMETRIC VIEW




## SECTION A-A




## SECTION B-B

## NOTES:

1. Detectable warning domes will cover 2'-0" length and full width of the ramp floor as shown on sheet 13 of 15.

TOWN of WAKE FOREST

# TOWN of WAKE FOREST, NC

**Manual of Specifications, Standards and Design**

## SINGLE CURB RAMP WITH EXISTING CURB & GUTTER

| Scale: | Detail #: |
|---|---|
| Not To Scale | 2.13 |
| Revision Date: | Sheet #: |
| October, 2013 | 3 of 15 |